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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/697,401

10/29/2003

Tony J. Keeton

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EXAMINER

DHINGRA, RAKESH KUMAR

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 04/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/697,401

Applicant(s)

KEETON ET AL.

Examiner

Rakesh K. Dhingra

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 and 27-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 and 27-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments with respect to claims 1, 12, 18, 27 have been considered but are moot in view of the new ground(s) of rejection as explained below:

Applicant has amended claims 1, 12, 18, 27 by adding new limitation "veins angled with respect to a radial direction of". New reference by Deaton et al (US patent No. 5,960,555) has been found that reads on claim limitations of claims 1, 18, 27.

Accordingly claims 1, 18, 27 have been rejected under 35 USC 102 (b) as explained below. Dependent claims 2, 19, 28 have also been rejected under 35 USC 102 (b) as explained below.

Claim 12 and dependent claims 3-17, 20-22 have been rejected under 35 USC 103 (a) as being unpatentable over Deaton et al in view of Goodman as explained below.

Claim 29 has been rejected under 35 USC 103 (a) as being unpatentable over Deaton et al in view of Yudovsky et al (US Patent No. 5,985,033) as explained below.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1, 2, 18, 19, 27, 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Deaton et al (US Patent No. 5,960,555).**

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***With respect to Claims 1,18,27,28:*** Deaton et al discloses an apparatus (Figs. 1, 5, 6) for processing a semiconductor substrate, comprising a substrate support structure 12 comprising a support element configured to support a substrate 10 of a particular size in a support plane defined by the support element, wherein the support element comprises an edge ring (annular veined ring) 134 supporting an outer edge of the substrate when the substrate is supported on the support element, the veined ring composed of a plurality of grooves (veins) 182 (Column 6, lines 35-65 and Column 9, lines 50-65). Deaton et al teach that grooves 182 extend in an "approximately" radial direction. Since claim recites "veins angled with respect to radial direction" the angle could be any number greater than zero degrees. Dictionary meaning of word approximate is - "not quite exact, but only slightly more or less in number or quantity" which would include angles varying from radial direction and thus Deaton et al's reference reads on the claim limitation regarding "angled with respect to a radial direction".

***With respect to Claim 2:*** Deaton et al discloses that the edge ring 134 could have a large number of grooves (veins) spaced together (could include more than 300 veins) to provide a more uniform outward radial flow of purged gas [Column 10, lines 1-3].

***With respect to Claim 19:*** Deaton et al that plurality of grooves (veins) 182 are formed in an edge ring (annular ring) 134 to support an outer edge of the substrate 106.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 3-17, 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deaton et al (US Patent No. 5,960,555) in view of Goodman (US PG PUB No. 2003/0198910).**

***With respect to Claim 3:*** Deaton et al teach all limitations of the claim except a first annular groove positioned radially inward from the support element.

Goodman discloses an apparatus (Figure 1A, 3C) for semiconductor processing that includes a substrate holder 200 comprising a grid structure and has a first annular groove G (Figure 1A), that is positioned radially inward from the grid protrusions

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(support element) 222 (Paragraph 0011). Deaton et al and Goodman are analogous art because they are from the same field of endeavor, namely substrate holders.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the substrate support element of Deaton et al by grid groove structure as taught by Goodman in the apparatus of Deaton et al to minimize problems due to slide and stick.

***With respect to Claim 4:*** Goodman discloses that the first annular groove has a generally uniform annular thickness (Fig. 1A Item G).

***With respect to Claim 5:*** Goodman discloses the substrate holder further comprises a substrate pocket (Fig. 3C, 4C, Item 202) and the first annular groove is formed such that the first annular groove is lower than a surface of the substrate pocket (Fig. 3C, 4C Item 222).

***With respect to Claim 6:*** Goodman discloses a second annular groove on the substrate holder, the second annular groove being positioned radially outward from the support element (Fig. 1a Item 7).

***With respect to Claim 7:*** Goodman discloses that a vertical depth of the first annular groove is greater than a vertical depth of the second annular groove (Figs. 3C, 4 Item 222).

***With respect to Claim 8:*** Goodman discloses an annular ring raised above the substrate pocket and positioned radially inward of the support element (Fig. 4 Item 220).

***With respect to Claim 9:*** Goodman discloses that the substrate holder is configured to be supported by a spider structure 22 comprising a vertical shaft 24 and at least three

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substrate holder supporters extending radially outward and upward from the shaft, the substrate holder supporters configured to support the bottom surface of the substrate holder (Paragraphs 0034, 0035).

***With respect to Claim 10:*** Goodman discloses that the bottom surface of the substrate holder includes a recess configured to receive upper ends of the substrate holder supporters of the spider structure (Fig. 3B Item 214).

***With respect to Claim 11:*** Goodman discloses an apparatus in accordance with Claim 9, wherein the bottom surface of the substrate holder includes a circular groove centered about a central vertical axis of the substrate holder (Fig. 3B Item 214), the circular groove configured to receive upper ends of the substrate holder supporters of the spider structure (Fig. 3B Item 214), the circular groove of the bottom surface being interrupted in one location (Fig. 3B Item 216).

***With respect to Claim 12:*** Deaton et al in view of Goodman teach all limitations of the claim including an apparatus for processing a substrate, comprising: a reaction chamber (Goodman - Fig. 2 Item 12); a plurality of radiant heating elements configured to heat the reaction chamber (Goodman - Fig. 2 Item 14); and a substrate holder in the reaction chamber (Fig. 2 Item 20), the substrate holder having a plurality of support elements configured to support a substrate of a particular size within a support plane defined by the plurality of support elements, wherein the support elements comprise a plurality of spaced veins 182 configured in an annular ring 134 to support an outer edge of the substrate (Deaton et al, Figure 5, 6)

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**With respect to Claim 13:** Deaton et al in view of Goodman discloses that the substrate holder further comprises a substrate pocket (Fig. 4 Item 202), and an annular groove formed in the substrate pocket and configured to surround an outer edge of the substrate (Fig. 4 Item 204) when the substrate is supported on the plurality support elements 182 (grooves) [Deaton et al, Fig. 5,6].

**With respect to Claim 14:** Deaton et al discloses that the support plane is formed by top surfaces of the plurality of spaced veins 182 (Fig. 5, 6).

**With respect to Claim 15:** Goodman discloses that apparatus further comprises an annular recess in the substrate pocket, the annular recess positioned radially inward of the support elements (Fig. 5 Item 222).

**With respect to Claim 16:** Goodman discloses a support structure configured to support the substrate holder, the support structure comprising a vertical shaft and a plurality of support arms extending generally radially outward and upward from the shaft, the support arms having upper ends configured to support the substrate holder (Fig. 2 Items 22, 24).

**With respect to Claim 17:** Goodman discloses that apparatus comprises an annular ring on the substrate holder, the annular ring being positioned radially inward of the support elements and having a raised surface higher than a surface of the substrate pocket but no higher than the support plane (Fig. 4 Item 220).

**With respect to Claim 20:** Goodman discloses that apparatus comprises a plurality of annular recesses in the susceptor, wherein a first of the plurality of recesses is positioned radially outward of the plurality of veins (Fig. 4 Item 204) and a second of the



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plurality of recesses is positioned radially inward of the plurality of veins (Fig. 4 Item 222).

***With respect to Claim 21:*** Goodman discloses that apparatus further comprises an annular ring on the susceptor, wherein the annular ring being positioned radially inward of the plurality of veins and having a raised surface no higher than the support plane (Fig. 4 Item 220).

***With respect to Claim 22:*** Goodman discloses an annular ring on the susceptor the annular ring being positioned radially inward of the plurality of veins and having a raised surface no higher than the support plane (Fig. 4 Item 228).

**Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deaton et al (US Patent No. 5,960,555) in view of Yudovsky et al (US Patent No. 5,985,033).**

***With respect to Claim 29:*** Deaton et al teach all limitations of the claim except that at least some of the veins are curved.

Yudovsky discloses a veined ring wherein at least some of the veins are curved (Fig. 6 Item 10, Column 7 Lines 46-50). Deaton et al and Yudovsky et al are analogous art because they are from the same field of endeavor, namely substrate holders.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to form Deaton et al's veined ring further including at least some of the veins are curved in view of the teaching of Yudovsky. The suggestion or motivation for doing so would have been to provide a more laminar flow because the change in direction of flow is less abrupt as taught by Yudovsky (Column 7 Lines 49-50).

### ***Conclusion***

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Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rakesh Dhingra



Parviz Hassanzadeh  
Supervisory Patent Examiner  
Art Unit 1763